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TELEPHONE (808) 526-9566
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April 13, 1992

Mr. William W. Paty
Chairperson, Board of Land
and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Paty:

Reference is made to your letter of January 10, 1992 to Mr. Allan G. Kawada of True Geothermal Energy Company regarding the Company's drilling permits for Wells KA 2-1 and KA 3-1 and their Emergency Plan. While there have been continuing discussions prior to and subsequent to your January 10, 1992 letter, we believe it is necessary at this point to make our position a matter of record. As you are aware, the referenced drilling permits and Emergency Plan were previously approved by your Department. We are unaware of any action on True's part which should effect the authority granted under the drilling permits to proceed immediately with our scheduled drilling activities.

While we concur with the State and County's stated goal in your January 10, 1992 letter "to minimize potential future adverse impacts and determine whether geothermal development by Puna Geothermal Venture can proceed safely and without impacts to project personnel and the public health of the community" we are unaware of any action on our part or our submittals which would raise a question as to why our drilling and well completion program cannot proceed safely and without impacts to project personnel and the public health of the community. As you know, our drilling and well completion programs are completely different from what PGV had on file before your requested changes were instituted. We further believe that what we have on file with your Department conforms to the recommendations issued by the independent investigative report which is being incorporated in part by the Geothermal Management Plan. If there are specific shortcomings with what we have on file, please notify us and we will promptly discuss your concerns with you. We have always worked with your Department and will continue to do so, but please be aware that we will not

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HONOLULU, HAWAII 96813-2918

Mr. Manabu Tagamori
Department of Land and
Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

HAND DELIVERY

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. BOX 373
HONOLULU, HAWAII 96809

JUN 18 1992

Mr. Duey Milner
400 East Roberts Lane, #37
Bakersfield, California 93308

Dear Mr. Milner:

Thank you for reviewing the geothermal well drilling permits for True/Mid-Pacific Geothermal Venture's KA2-1 and KA3-1.

As discussed, your comments will be incorporated as follows:

1. Addition of a double gate preventer to the 20-inch bope stack will be optional. The 20-inch hydrill bag bope is consistent with the Geothermal Management Plan.

2. Addition of a mud pit alarm and monitor will be evaluated by True to back-up their existing equipment.

3. Contrary to your understanding, the drill permit application shows that the 12-inch 900 series blowout preventer will be tested to 1500 psi for 30 minutes.

4. As stated, True drilling personnel are continually trained by Therma Source Incorporated, who is their drilling consultant for the project.

We certainly appreciate your assistance on this matter.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

HY:lc

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

MANABU TAGOMORI
DAN T. KOCHI

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:WRM-KO

JAN 10 1992

Mr. Allan G. Kawada
True Geothermal Energy Company
Central Pacific Plaza
220 South King Street, Suite 868
Honolulu, Hawaii 96813

Dear Mr. Kawada:

The Department of Land and Natural Resources, together with the Department of Health and the County of Hawaii, has been working towards the implementation of an interagency Geothermal Management Plan (GMP). The GMP is the result of three independent investigative reports which recommended specific government and developer actions. The overall goal of the GMP has been to minimize potential future adverse impacts and determine whether geothermal development by Puna Geothermal Venture (PGV) can proceed safely and without impacts to project personnel and the public health of the community.

All of the recommendations identified within the GMP have been implemented or are near completion. Those items related specifically to drilling procedures, equipment, supervision, etc., have been adequately addressed by PGV and approved by our Department.

Consistent with the recommendations of the investigative reports and the GMP, the Department has determined that a third-party review of True Geothermal's drilling and well completion program will be required. Although the Geothermal Well Drilling Permits for True/Mid-Pacific's Wells KA2-1 and KA3-1 have been approved, such approval is conditional and shall be subject to the required independent review. No commencement of any activity authorized under these permits shall be permitted until this review has been completed.

Additionally, the Department shall require that your Emergency Plan be resubmitted to both the Department of Health and the Hawaii County Civil Defense Agency for review and approval. It is recommended that the Emergency Plan be revised, where appropriate, incorporating any new and pertinent information that is available prior to submission of the plan to the respective agencies.

Upon approval of the Emergency Plan and concurrence by the Department of the findings of the independent drilling/casing program review, True Geothermal Energy Company will be duly notified and allowed to proceed with the drilling of the permitted wells.

Thank you for your continued cooperation and should you have any questions concerning the above, please contact Manabu Tagomori, Deputy Director, at 587-0214.

Very truly yours,

WILLIAM W. PATY

cc: DBEDT
DOH
Hawaii County Civil Defense Agency
Hawaii County Planning Department

REGULATION BRANCH
Division of Water Resource Management

OM: Dean DATE: 10/2 FILE IN: _____

TO:	INITIAL:		PLEASE:	
___	___	G. MATSUMOTO	___	See Me
___	___	F. Ching	___	Call
			✓	Review & Comment
___	___	T. Kam	___	Take Action
___	___	S. Samuels	___	Investigate & Report
___	___	D. Nakano	___	Draft Reply
___	___	S. Yong	___	Acknowledge Receipt
✓	___	C.P. Chang	___	Type Draft
___	___	J. Swift	___	Type Final cc:___
___	___	T. Nakama	___	Xerox ___ copies
___	___	B. Micua	___	File
___	___	_____	___	Mail
			FOR YOUR:	
___	___	G. AKITA		
___	___	L. Nanbu	___	Approval
___	___	E. SAKODA	___	Signature
___	___	E. LAU	✓	Information
___	___	L. CHANG		
___	___	Y. SHIROMA		
✓	___	M. TAGOMORI		
___	___	S. Kokubun		

REMARKS:

Attached is copy of draft Position Statement prepared by Sus Ono. Per his instructions, this was sent to Lewin (DOH) and Towill (DBED) for review and comment. DOH & DBED are to respond to Patty directly with their comments by Friday noon (10/4). (Sus to incorporate comments.) Patty has copy of the attached.

Rev. 4/91

Dean

STATE'S POSITION ON TRUE/MID-PACIFIC'S
REQUEST TO RESUME DRILLING ACTIVITIES
(WELL PAD #2)

The State of Hawaii will not authorize True/Mid-Pacific to resume drilling activities unless all of the following items are satisfied:

1. Receive approvals from the County of Hawaii for all necessary County plans and/or permits, including grubbing and grading permits. Also, reaffirmation of the previously approved Emergency Response Plan.

2. Agree to adhere to State approved guidelines and recommendations made by a technical team to be engaged by the State of Hawaii regarding drilling equipment, techniques, and procedures. This is to minimize any potential adverse safety and health impacts related to drilling activities. The technical team will review and make appropriate recommendations concerning previously approved plans and permits such as the Plan of Operation, the Conservation District Use Permit's decision and order, and the Authority to Construct Permit, relative to drilling operations and procedures. The technical team will also scrutinize the yet to be submitted Geothermal Well Drilling Permit application prior to DLNR making its decision on the drilling permit request.

3. Agree to cooperate with regulatory agencies recognizing that True/Mid-Pacific will be subjected to monitoring that is to be at least as intensive and extensive as that required for PGV.

4. Agree that drilling activities, including grubbing and grading, shall not commence before November 1, 1991, or until PGV is granted permission to resume drilling activities, whichever occurs first. Such a timetable will allow regulatory agencies to put in place necessary enforcement and monitoring mechanisms, and also allow the PGV and True/Mid-Pacific projects to be subjected to similar degrees of control.

The above four items have been agreed to by the Department of Health, Department of Land and Natural Resources, and the Department of Business, Economic Development, and Tourism, serving in a coordinative role.

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
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REF:WRM-KO

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True Geothermal Energy Company
Central Pacific Plaza
220 South King Street, Suite 868
Honolulu, Hawaii 96813

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Upon approval of the Emergency Plan and concurrence by the Department of the findings of the independent drilling/casing program review, True Geothermal Energy Company will be duly notified and allowed to proceed with the drilling of the permitted wells.

Thank you for your continued cooperation and should you have any questions concerning the above, please contact Manabu Tagomori, Deputy Director, at 587-0214.

Very truly yours,

WILLIAM W. PATY

cc: DBEDT
DOH
Hawaii County Civil Defense Agency
Hawaii County Planning Department

HAWAII COUNTY CIVIL DEFENSE AGENCY
34-A Rainbow Drive
HILO, HAWAII 96720

Phones · 935-0031
935-0032

0099P

March 23, 1989

Dean Nakano
Department of Land and Natural Resources
Division of Water and Land Development
Box 373
Honolulu, Hawaii 96809

RE: Geothermal Exploration Drilling Activities Within the Kilauea Middle East Rift Zone, TMK 1-2-10:3

The Emergency Plan as submitted by True/Mid-Pacific Geothermal Venture, required by the State Board of Land and Natural Resources, has been reviewed and is approved as meeting all requirements.

Thank you for the submittal and attention to public safety.

Harry Kim

Harry Kim, Administrator
Hawaii County Civil Defense Agency

jg

cc: Duane Kanuha, Director
Hawaii County Planning Department

H. A. True, III, Partner
True Geothermal Energy Company

(10)

Emergency Plan

Objective. This emergency plan is designed to anticipate and plan courses of action to deal with possible medical emergencies and catastrophic events at the Kilauea Middle East rift zone geothermal project site, Figure 1, that could cause the health, safety and welfare of project personnel and other personnel present within the project site or residing near project activity to be seriously affected or endangered. Catastrophic events that could directly endanger personnel in the project site include volcanic activity (eruptions and lava flows, cracks and subsidence, earthquakes and faulting) fire, severe storms including hurricanes, and well blowouts. Natural events could result in the failure or destruction of facilities so as to cause extended venting of geothermal resources in which case there could be high levels of H_2S at the site of failure and exceedence of H_2S emmission limits at property boundaries. Medical emergencies are anticipated to include serious injury, burns, or over exposure to some process or by-product (e.g., H_2S) of project operations due to accidents, equipment or facility failure, or natural phenomena.

Safety policies, procedures and training, discussed in Appendix A, are designed to minimize the chances that natural events or project activities will cause injury or create a health hazard. This plan outlines those steps and procedures that would be implemented when certain events do occur (or appear likely to occur) that cause or could cause loss of life, serious injury or health hazards to personnel within or near project activity sites.

When there is high probability of a natural event occurring within the next 48 hours which threatens the health and safety of project personnel or other

personnel near project activity, project facilities or equipment, the drilling supervisor will assess his current operational situation to determine, depending on the likely time event will occur, whether any specific activities should be speeded-up, terminated, reduced, delayed in start-up or modified and whether emergency measures should be initiated in preparation to secure wells, break down and/or remove equipment and evacuate personnel. Personnel on site would be alerted as to the threating condition and given any specific instruction on preparing for or executing emergency procedures.

Management would be contacted and apprised of the situation and the actions taken thus far and those contemplated. All off-site project personnel would be contacted and given instructions to return to the site or to stand by in preparation to return if required. At present, there are no telephone lines into the project site. All communications will have to be via mobile phone.

The County Civil Defense Office (via the County Police Department) and other government and private agencies that would be involved in project emergency actions would be apprised of the situation and the actions being taken or planned and whether any assistance is required or anticipated. (See Emergency Contact List). In the event an emergency situation threatens public health or safety, the County Civil Defense office will establish a command post for the use of all public safety officials and for liaison with project management and technical personnel. Civil Defense will coordinate release of information to the public concerning any public hazard (i.e., outside the project site). The drilling supervisor and project management personnel will be available on a 24-hour basis to provide liaison with Civil Defense and provide updates on conditions relevant to the hazard to the public.

Specific Events

1. Volcanic Activity

In the event of an eruption or impending lava flow, the Operations Supervisor will be in constant communication with Hawaii Volcanoes Observatory (HVO) so that the immediate threat to the drilling operation may be assessed. Volcanic eruption reports may also be obtained from HVO recordings at 808-967-7977. It is important to determine how much time is available to secure a well that is being drilled since the time required to temporarily close a well depends greatly on the depth of the well. The drilling industry has responded to these threats with technology and tools to secure wells that are in various states of drilling or completion in relatively short periods of time. These tools, commonly referred to as "storm plugs" or bridge plugs" are stored at the drilling site so that installation can occur on short notice in the event of an impending hazard.

Depending upon the time estimate on the occurrence of the threating event, a plan will be executed to ensure the safety of all personnel, as well as the security of the hole and drilling equipment. If sufficient time exists, steps will be taken to allow removal of expensive drilling equipment to a safe location. Table F-1 lists the priority and method of evacuating equipment.

Once a plan of action has been undertaken, the Operations Supervisor will maintain contact with HVO to monitor the development of the volcanic

PRIORITY ORDER OF MOVEMENT	RIG ITEM	METHOD OF MOVEMENT	COMMENT
1	Generator Unit	Flat bed truck with winch and tail roller	Unit could be disconnected and dragged on flat bed quickly.
2	Fuel and Fuel Tanks	Tanker truck for fuel; Flat bed truck for tank	Fuel would be pumped off onto a transfer tanker truck and the storage tank moved as a low priority item.
3	Air Compressor	Tractor truck without trailer	Units are easily disconnected and can be moved with a tractor while generator unit is being moved.
4	Mud Pumps	Flat bed truck with winch and tail roller	Unit disconnects easily after draining mud to sump.
5	Cementing Unit	Tractor truck without trailer	Unit can be maintained disconnected off location to be transported to the site and connected only when needed.
6	Electric Logging Unit	Flat bed truck with winch and tail roller	Unit usually maintained disconnected off location until needed when it is transported to the site and connected for use.
7	Mud Logger's Trailer	Pick-up truck	Unit disconnects quickly and can be moved at any time with pick-up truck.
8	Abatement Equipment	Tractor truck without trailer	Unit maintained disconnected off location while not in use, however, when in use, disconnects easily.
9	Accumulator	Flat bed truck with winch and tail roller	Disconnects quickly for easy movement.

Table 1 to
Emergency Plan

ORDER OF MOVEMENT	RIG ITEM	METHOD OF MOVEMENT	COMMENT
10	Catwalk Racks and Drill Pipe	Forklift and Flat bed truck	Drill pipe in hole or derrick remains on location. Pipe on ground can move quickl with forklift.
11	Parts House/ Change Room	Flat bed truck with winch and tail roller	Only connected to rig with electric wire. Disconnects quickly.
12	Doghouse/Tool-Pushers Trailer and Air Compressor Trailer	Flat bed truck with winch and tail roller/Pick-up truck.	Disconnects quickly for easy movement. Low priority item.
13	Water Tanks	Flat bed truck with winch and tail roller	Water is drained to sump and tank is move as a low priority item.
14	Air Drilling Muffler	Crane and flat bed truck	Moved as low priority item.
15	Mud Tanks	Flat bed truck with winch and tail roller	Mud is drained to sump and tanks moved as low priority item.
16	Sub-structure, Drawworks and Derrick	Crane and flat bed trucks	Low priority items since they require too much time to move. Sub-structures elevate draw works and derrick base on pedestal approximately 26' above ground level.

event as it proceeds, to determine if the chosen plan of action should continue or be amended.

The first priority response to the threat as related to in-progress drilling operations is concerned with the safety of all project personnel and near-by residents that could be impacted because of damage or failure of project systems and facilities.

The next order of priority is to leave the well bore in a safe condition. The well bore can be isolated from the ground surface safely with the installation of a bridge plug or storm plug. This oilfield tool is inserted into the well bore on the drill pipe and set at any depth in the casing. The drill pipe below the plug can be safely suspended from the plug. The drill pipe above the plug can be unscrewed and removed or left in place. By installing this plug into the well bore and closing all surface well head valves the hole can be isolated to prevent movement of fluids or gases from the lower potentially productive zones to the surface as well as prevent surface fluids from moving down the hole.

The bridge plug is built to withstand high pressures and temperatures and is available in various sizes. Drilling plans call for plugging tools such as these to be kept on-site at all times while drilling below the 13-3/8" casing string. All rig personnel will be familiar with all aspects of running and setting these tools, so that if an emergency occurs the well bore can be safely secured and isolated before personnel

leave the rig. These tools can also be easily removed after the hazardous condition has ended and drilling operations are resumed.

All valves and well heads are tested at the factory to hold pressure at 2,000 PSI and designed to withstand temperatures in excess of 2,500 degrees F. compared to 2,000 degrees F. lava temperature. In the event that the entire well head assembly is destroyed by a massive flow, the subsurface bridge plug would isolate the well bore from the lava. Should continuing volcanic activity prevent continuing operations at the site of an uncompleted well, the well will be properly plugged by setting the required cement plugs above the bridge plug.

The last priority would be the protection of the drilling equipment. Certain portable pieces of drilling equipment and rig components would be removed and relocated to a safe area if time permits. These components will be selected by the supervisor at the time the threatening condition is manifested and depending on the status of operations at the time. Priorities in evacuation and the equipment that will be needed in the event of emergency evacuation will be updated as project development proceeds. Trucks and cranes necessary for a move would be prearranged so that they will be available in the event they are needed.

The following sequence of operations will be followed in total or in part, based on the time factor allowed by the emergency condition. (It should be kept in mind that Hawaiian lava flows are non-explosive and therefore good estimates of lava flow direction and speed can be made when the vent is up the rift zone or above the project site.)

1) Assess the emergency, consulting with HVO to determine speed and direction of the lava flow. If the situation warrants immediate action, close all surface valves and evacuate all personnel from the location.

2) If time permits, contact operators of cranes and trucks and arrange for removal of designated drilling equipment.

3) If the emergency occurs while drilling, raise the drill string from bottom at least 400 feet and install the bridge plug on the drill string. Run the bridge plug into the well bore to a depth of approximately 300 feet and set and test the bridge plug in 13-3/8" casing. If time allows, remove the drill string. This procedure requires about one hour to accomplish.

4) If the drill string is out of the hole when emergency occurs, install bridge plug in the well bore to a depth of 300 feet. Set and test the plug, then remove the drill string above the plug if time permits. This procedure requires half an hour.

5) Close all surface valves and blowout preventers to isolate the well bore.

6) If time allows, remove designated drilling equipment with cranes and trucks.

7) When safe, return to the drill site, inspect and clear well head and rig area, if feasible, screw on drill pipe, remove the bridge plug, remove bridge from drilling assembly, and resume drilling.

2. Earthquakes

Since no detection systems have yet been devised to predict or warn of an impending earthquake, such events have to be assumed and engineering

design of facilities and systems planned to withstand the magnitude of potential earthquakes in the area with a comfortable margin of safety. For construction standards, Hawaii is considered to be in Zone 3.

Regardless of design criteria, it is still possible that personnel could be injured in an earthquake and systems could fail or be severly damaged which in turn could cause injury or create a health hazard. In such situations, the drilling supervisor, or other personnel on the scene will have to take immediate action to deal with any injured personnel and to correct any failed system that is causing or posing a danger to the health and safety of personnel in the area. Procedures for evacuation of personnel and coordination of emergency conditions with medical facilities, the Director of Civil Defense, Hawaii County, and other agencies would follow those used for volcanic activities.

3. Fires

The project area is located in an area that may be susceptible to fast moving fires. Project personnel will be continually instructed on the precautions necessary to avoid creating fires or fire hazards and to be alert at all times for detecting and reporting fires initiated anywhere in the area.

Fire suppression systems for fighting fires at and near the drilling site will be established. The water catchment pond will provide the means of fighting fires in and adjacent to the drilling site. Portable extinguishers for chemical and fuel fires will be located at several

locations in the drilling site. In the event of a fire, project personnel will take immediate action to extingish the fire or control it while additional fire fighting means or support can be applied. Fires will be reported to the Fire Department emergency number (961-6022). Fire fighting equipment is stationed at Keaau, with an additional fire truck at Pahoa.

Should a major forest fire approach the drilling site, the drilling supervisor will make the same evaluations concerning current operations and evacuation of personnel and equipment as for an impending or actual volcanic eruption. In addition, special attention will be given toward removing materials that could cause explosions and severe hazards to personnel remaining in the area and intensifying of the forest fire. The Fire Department will be apprised of conditions at the project site periodically as long as the forest fire remains a threat.

4. Blowouts and Exposure to Excessive Levels of H_2S

Should a blowout occur through the wellhead assembly or below the surface, the drilling crew's first response is to immediately detetermine that no one was or is about to be injured as a result of the blowout and if so, to take quick action to render assistance. Alertness for excessive H_2S levels is paramount and protective masks and clothing may need to be worn by all personnel in the area that may be exposed to extensive H_2S levels or the hot, high pressure geothermal fluid/steam. The drilling crew could be subject to sudden excessive levels of H_2S due to a blowout, or through the blooie line when drilling with air. Speed

is essential in rescuing an individual exposed to levels of H_2S which could be life threatening in 30 minutes or less. Inhalation of H_2S at levels of 500-600ppm at, or immediately adjacent to the emission point, could constitute such an emergency. However, any levels over 50ppm would be treated as dangerous and personnel safety precautions and procedures would be implemented while actions are taken to control/reduce the H_2S emission levels. Should excessive emissions occur and overcome an individual, the emergency rescue procedures to be followed, as described in Tab A to this Appendix, represent practices recommended by the Workmen's Compensation Board, Alberta, Canada and the American Heart Association. The procedures were compiled and printed in publication No. M10, Department of Conservation, Division of Oil & Gas, State of California.

After assuring that personnel are safe from a blowout (or an event of excessive levels of H_2S in the area), the drilling supervisor will assess the blowout to ascertain the cause and what immediate steps can be taken to contain, control or secure the blowout. Management will be notified of the situation so that immediate action can be taken to obtain technical assistance and/or special equipment as may be required. Similarly, if excessive H_2S levels are emanating from the blooie line, immediate adjustments will be made in the injection of H_2S abatement chemicals to reduce the H_2S emissions to normal controlled levels.

In the event of a blowout, downwind H_2S monitors will be read as a precautionary measure to determine whether based on existing

meterological conditions the H_2S concentrations could be expected to impact residences near the project area. The Director, Civil Defense, County of Hawaii and the Director of the Health Department, or designated representative, will be notified of the blowout, the nature of the blowout, the levels of H_2S being monitored downwind of the well, the current meterological conditions, estimates on what concentration levels are likely to exist at the nearest residential boundary, and a tentative estimate, if possible, of the time required to secure the blowout. Off-site personnel will be contacted to return to the site if required.

Any changes in the conditions first reported to Civil Defense and the Health Department will be promptly reported to those agencies.

5. MEDICAL EVACUATION. In case of an injury at an exploration well site during construction, drilling, or testing, there will be first aid services to handle minor injuries. Serious injuries that require immediate medical attention must be provided at appropriate medical centers. Assistance for these injuries will be requested via the Fire Department emergency number, 961-6022. The closest hospital is located in Hilo. An ambulance will require approximately 40 minutes to make the trip from Keaau to the project site. This will be the primary method of medical evacuation, however, other methods are available. Private vehicles could be utilized, however the patient would not have the services of a paramedic until the ambulance was met. Helicopter evacuation may be feasible if one is readily available in the area from the company or companies with which operating agreements have been concluded on providing such emergency service.

In case of serious burns, victims may have to be transported to Oahu (Straub Clinic) for treatment or even to a recognized burn treatment center such as Sherman Oaks, California.

6. POLICY ON THE NOTIFICATION OF SUBSTANTIAL RISK

The Toxic Substances Control Act (TACA) requires under Section 8 (e) that any person who obtains information that reasonably supports a conclusion that any chemical substance or mixture presents a substantial risk to health or the environment should report this to the EPA.

To comply with these requirements, the Policy of the "Operator", TRUE Geothermal Energy Company, is as follows:

> Employees who acquire information that reasonably suggests that a chemical substance or mixture used in project operations may present a substantial risk to health or the environment will inform the operator's Administrative Coordinator. This action should be taken as soon as such information is received, without awaiting a final report, conclusions, or results of subsequent or confirmatory studies.
>
> The Administrative Coordinator will inform and consult with appropriate Environmental Affairs, Legal and management personnel and will coordinate all reports to the EPA. Any reporting to the EPA

will be done in consultation with appropriate operating company management.

Copies of reports of all toxicological studies and all investigatory studies made relating to health or environmental concerns shall be evaluated in regard to TSCA §8 (e) reporting and for filing with other health and environmental information.

The persons initially bringing the information to the attention of management will be informed of the decision on filing a notice of substantial risk.

Failure to comply with the provisions of this policy could lead to Federal penalties under TSCA.

EMERGENCY RESCUE AND FIRST AID PROCEDURES

FOR

VICTIMS OF EXCESSIVE H_2S INHALATION

(TO BE POSTED IN A POSITION CLOSE TO THE DRILLING SITE)

TAB A
Appendix F
Emergency Plan

Rescue and First Aid Procedures

For Victims of Excessive H_2S Inhalation*

1. SPEED IS ESSENTIAL IN RESCUING A VICTIM AND IN ADMINISTERING FIRST AID.

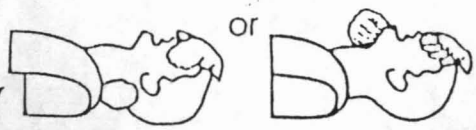
2. THE RESCUER DONS SELF-CONTAINED BREATHING EQUIPMENT BEFORE APPROACHING THE DANGER AREA AND THE VICTIM. WHEN POSSIBLE, THE RESCUER SHOULD HAVE A PARTNER ON A LIFE LINE.

3. THE RESCUER IMMEDIATELY MOVES THE VICTIM TO FRESH, PURE AIR WHILE OTHER PERSONNEL OBTAIN THE RESUSITATOR FOR USE ON THE VICTIM, AND CALL FOR MEDICAL ASSISTANCE.

(SEE SUCCEEDING PAGES, PARAGRAPHS 4 THROUGH 13, FOR FIRST AID PROCEDURE.)

* These procedures represent practices recommended by the Workman's Compensation Board, Alberta, Canada, and the American Heart Association.

*4. Airway



If you find a collapsed person, determine if victim is conscious by shaking the shoulder and shouting "Are you all right?" If no response, shout for help. Then open the airway. If victim is not lying flat on his back, roll victim over, moving the entire body at one time as a total unit.

To open the victim's airway, lift up the neck (or chin) gently with one hand while pushing down on the forehead with the other to tilt head back. Once the airway is open, place your ear close to the victim's mouth:

- LOOK — at the chest and stomach for movement.
- LISTEN — for sounds of breathing.
- FEEL — for breath on your cheek.

If none of these signs is present, victim is not breathing.

If opening the airway does not cause the victim to begin to breathe spontaneously, you must provide rescue breathing.

5. Breathing

The best way to provide rescue breathing is by using the mouth-to-mouth technique. Take your hand that is on the victim's forehead and turn it so that you can pinch the victim's nose shut while keeping the heel of the hand in place to maintain head tilt. Your other hand should remain under the victim's neck (or chin), lifting up.

Immediately give four quick, full breaths in rapid succession using the mouth-to-mouth method.

6. Check Pulse

After giving the four quick breaths, locate the victim's carotid pulse to see if the heart is beating. To find the carotid artery, take your hand that is under the victim's neck and locate the voice box. Slide the tips of your index and middle fingers into the groove beside the voice box. Feel for the pulse. Cardiac arrest can be recognized by absent breathing and an absent pulse in the carotid artery in the neck.

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For Infants and Small Children

Basic life support for infants and small children is similar to that for adults. A few important differences to remember are given below.

Airway

Be careful when handling an infant that you do not exaggerate the backward position of the head tilt. An infant's neck is so pliable that forceful backward tilting might block breathing passages instead of opening them.

Breathing

Don't try to pinch off the nose. Cover both the mouth and nose of an infant or small child who is not breathing. Use small breaths with less volume to inflate the lungs. Give one small breath every three seconds.

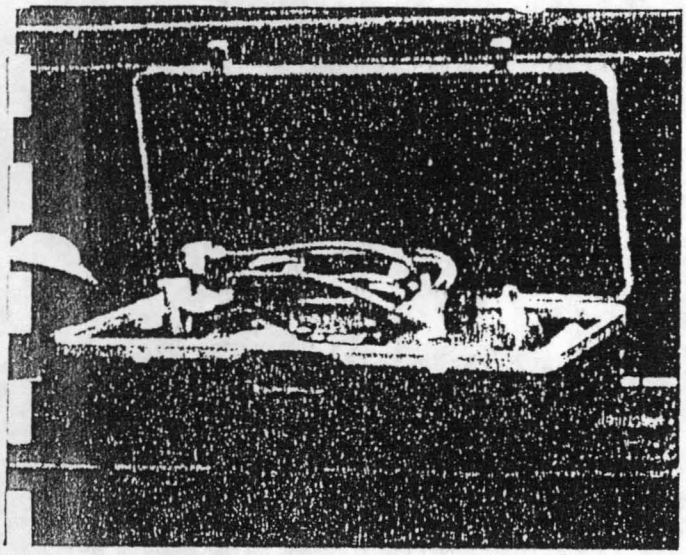
Check Pulse

The absence of a pulse may be more easily determined by feeling over the left nipple.

7. *If you CAN find the pulse,* continue rescue breathing until victim revives or the resuscitator is readied. (Exercise care due to possible lung congestion.) According to the American Red Cross rescue breathing instructions, you should:

- Repeat breaths about 12 times a minute for an adult or 20 times a minute for a child.
- Establish a rhythm.
- If victims's stomach rises, press it gently to remove air.
- As patient revives, watch closely. Treat for shock.

If you CANNOT find the pulse, the victim needs CPR, Cardiopulmonary Resuscitation. CPR should be administered ONLY by a person properly trained and certified. It is too complicated to be taught from printed pages alone.



A resuscitator. *Photo by Murray Dosch.*

. The Pneolator is an instrument that performs artificial respiration with an automatic, predetermined pressure on inhalation, and without suction on exhalation. This most nearly represents normal respiration and has been selected by medical authorities as the method of choice in restoring breathing.

Once the patient is breathing, the Pneolator becomes an effective oxygen inhalator by a simple adjustment. If the air passage is obstructed by mucous or foreign material, a warning is immediately given by a chattering of the cycling valve, and the Pneolator provides an aspirator for removing the obstruction. The Pneolator can be taken with a victim to the hospital.

NOTE: The small oxygen bottles carried by most ambulances are not the type required for a Pneolator. The 21 cubic foot bottle of oxygen in the Pneolator should be checked and filled to capacity *before* all well testing operations. Furthermore, it is strongly recommended that an extra supply of oxygen (a commercial tank) be kept on hand as a "standby" supply.

This large oxygen cylinder can be hooked up to the resuscitator while it is being used to increase the volume of oxygen that is available for use should there be more than one victim overcome.

.. Keep victim warm and quiet, but never unattended.

1^ A person who has been overcome by H_2S gas and revived could go into shock. Because of this, take the victim to a doctor at once. Patients should be kept under medical observation until the doctor declares them fit to return to work.

11. A patient breathing normally may be given stimulants such as tea or coffee. (Alcohol is a depressant).

12. If eyes are affected by H_2S, wash them thoroughly with clear water. For slight eye irritation, cold compresses will help.

13. Once a victim is removed to fresh air and normal respiration restored before heart action ceases, rapid recovery may be expected.

In cases of slight or minor exposures, where the worker has not been totally unconscious and wants to return to work after a short rest period, it is recommended that duty be postponed until the following day. Reflexes may not have returned to normal, and the person could be subject to injuries from other work hazards.

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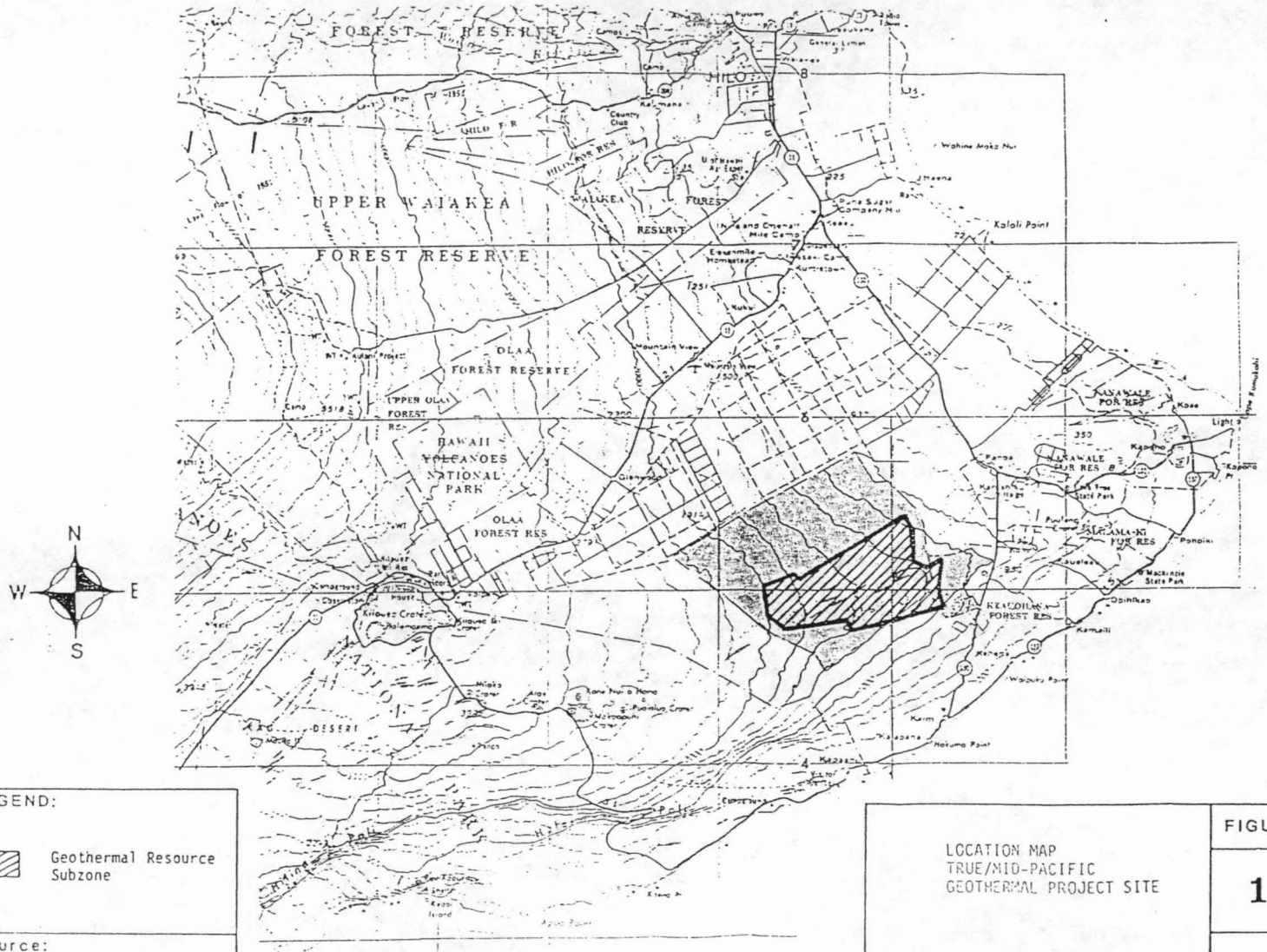

LEGEND:

Geothermal Resource Subzone

Source:

LOCATION MAP
TRUE/MID-PACIFIC
GEOTHERMAL PROJECT SITE

FIGURE

1

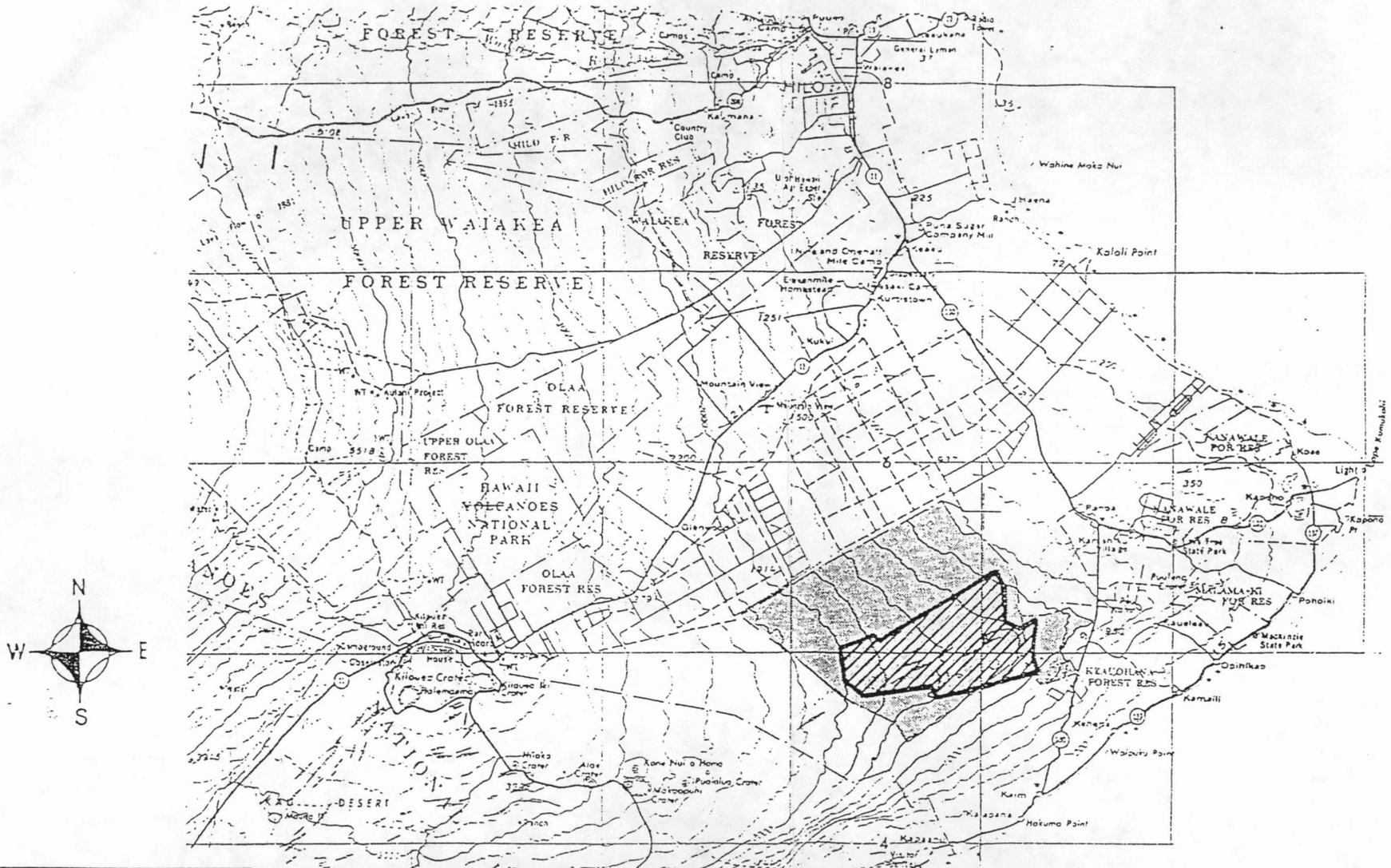

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FIGURE

1